

Pump Station S-3

This structure is a three unit pumping plant located in the alignment of Lake Okeechobee South Shore Levee, at the intersection of the Miami Canal with Lake Okeechobee, in the western section of Palm Beach County just north of the town of Lake Harbor, Florida. The pumping station is constructed of reinforced concrete and concrete block masonry superstructure with three (3) Fairbanks Morse Company 144 inch diameter vertical pumps each rated for 890 c.f.s. at 6.6 feet static head. Each pump unit is driven by a Fairbanks Morse Model 38D8-1/8, 960 Horsepower, in-line diesel engine connected to pump through right-angle type VBNX gear transmission manufactured by Philadelphia Gear Works. Priming of the main pumps is accomplished by an electric motor driven Nash Model L-6, 520 c.f.m. vacuum pump. Power for the station is furnished by two 150 KW AC Cummins, Model 6CTA 8.3-G2 generators. A 10-ton manually operated overhead bridge crane is provided for general service. Other station equipment includes a water system for washdown, a dewatering system for the intake bays for inspection and maintenance, and an electrically-operated hoist trash rake with compressed air control rake teeth for removing debris from the intake bay trash rack.

PURPOSE

The purpose of the structure is to pump surplus water into Lake Okeechobee via the Miami Canal from the agricultural area southerly of the pumping station at the rate of 3/4 inches per day from the 129 sq. mile tributary drainage area.

OPERATION

The pumping station will be operated whenever the water level in the Miami Canal within the agricultural area southerly of the pumping station exceeds 12.5 feet unless the water level in Lake Okeechobee is low enough to permit gravity discharge into the lake through S-354 at a desirable rate. The water surface should not be drawn below elevation 10.0 at the pumping station.

Under design head, the capacity of Pumping Station 3 is 2,580 c.f.s. The pumps should be started and stopped slowly, one pump at a time, so that high velocities and surges will not occur in the Miami Canal. S-354 should be closed during pumping operations.

Because of water quality concerns in Lake Okeechobee, at present, the station is operated according to the EAA Interim Action Plan.

The Operation Chart defines the entire recommended range over which pumping can be accomplished. Inasmuch as the reduction ratio between engine and pump is fixed, all pump rotative speeds are expressed in terms of engine speeds which are indicated on the engine tachometer. The rated speed is 715 r.p.m. At this speed each pump has a design capacity of 860 c.f.s. or greater with pool to pool heads not in excess of 6.4 feet and intake pool gauge between El. 13.0 and 10.3.

The pumps in this station are designed to pump drainage water containing a negligible amount of sediment or other material which might damage the surface of the pump or bearings. All pump bearings are designed for grease lubrication and to exclude dirt and grit. However, the quantity of water being pumped by the station should be reduced at any time the water in the suction bay becomes moderately silted or if it appears that the approach velocities are carrying a bottom load of sand into the sump chambers.

The main pumping units installed at station 3 are free from harmful criticals throughout the range of normal operating speeds from 580 to 715 r.p.m. inclusive. However, there exists a severe critical at 260 r.p.m. The unit should, therefore, be brought up to 300 r.p.m. immediately on starting. No operation should be attempted at speeds below 300 r.p.m.

FLOOD DISCHARGE CHARACTERISTICS

Discharge Rate	<u>2580</u> cfs
Headwater Elevation	<u>13.0</u> feet
Tailwater Elevation	<u>19.4</u> feet

DESCRIPTION OF STRUCTURE

Type	<u>3</u> pumping units in a reinforced concrete and concrete block structure
Number of Pumps	<u>3</u>
Size and Type of Pumps	<u>144 inch vertical propeller</u>
Design Rating	<u>860</u> cfs each
Impeller Speed	<u>71.4</u> rpm
Pump Manufacturer	<u>Fairbanks Morse</u>

Engine Make & Type Fairbanks Morse, Model 38D8-1/8, 6 cylinder, opposed piston diesel

Engine Horsepower 960 each

Engine Speed 715 rpm

Gates (per bay)

Number two

Location downstream end of discharge tube

Type vertical lift gates with flap gates for backflow protection

Size 10.33 feet high by 21 feet wide

Lifting Mechanism direct drive electric motor gear connected to gate stems

Dewatering Facilities (per bay)

Storage On site

Type levelhead gates

Date of Transfer: April 7, 1958; floodwalls May 15, 1963

POWER SOURCE

Normal Prime Movers: Diesel Engine

Station Power: Commercial Electricity

Emergency Diesel engine driven electric generators

HYDRAULIC AND HYDROLOGIC MEASUREMENTS

Water Level Remote digital recorder

Gate Position Recorder None

Engine Tachometer: Digital, on-site and remote recorders